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EMPIRE OF THE OCEAN AGAINST EMPIRE OF THE CONTINENT: AN ECONOMIC ANALYSIS OF STRATEGY

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Abstract

This paper presents an extended Aristotelian thesis, which relates sea power to the emergence of new institutions and organizations, which affect, in turn, economic performance. Institutions embody new knowledge, leading to innovation, "the making" economy more efficient and growth promoting. The *Continental System* introduced by Napoleon Bonaparte, is analysed as a case study of two different systems in conflict: France, a mainly land based power with a centralized government and an economy directed by the state, and Great Britain, a seapower relying mainly on a market economy, with strong trade, industry and relatively efficient financial institutions and organizations like the Stock Exchange, joint-stock companies, banks etc, dominated by private economic interests. Preconceived economic ideas by Napoleon are analysed as to their influence in shaping the Continental System. The paper goes on with an economic analysis of strategy that concludes, as follows: France, not being able to subdue Great Britain through a direct military confrontation, due to Great Britain's mastery of the sea, adopted an indirect strategy of trying to ruin her economy, first by the endeavour to reach her main source of wealth (as conceived by Napoleon) India by an overland route (the Egyptian expedition) and second, by the imposition of economic blockade, ie the Continental System. This ended again in failure because the seapower was inherently economically stronger, and because the Continental System imposed more costs than benefits to Napoleon's European allies, mainly Russia. A continental blockade would be only efficient in the long run if it was "watertight", ie encompassed all of Europe. In order to achieve this, Napoleon was led to wrong strategic decisions, first fighting a two front war (Portugal–Spain and Austria–Russia) and then undertaking the disastrous Russian campaign of 1812. The case study is concluded by generalizing it as a two-player game with asymmetric starting conditions and asymmetric strategies, which is dominated by the strategies of the "naval" player.

JEL classification: N0, N4, C7, C0.

Keywords: Institutional change, game theory, strategy, Continental System.

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1. The extended Aristotelian thesis

Aristoteles in his analysis of the "polities" (forms of government) of numerous Greek city–states of preceding and his time (5th and 4th centuries B.C.) argued that sea–power states (islands of Samos, Kerkyra, Aigina and cities of Corinth and Athens) were characterized by democratic governments, while land powers (states of Thessaly, Macedonia, Epirus and Sparta) were either "oligarchic" or kingdoms.

This thesis, appears to have some claim of validity over the centuries: Seapowers tended on the whole to exhibit more democratic forms of government compared to land powers, in relation to each historic period[1] although here too, some eminent exceptions appear. Rhodes, the main seapower in the Eastern Mediterranean and Marseilles, the main in the west during the 3rd century were both republics, as was Rome when it became a seapower in the 3rd century B.C., although Rome was already a republic by that time. The great medieval seapowers, Venice, Genoa and Pisa were also republics, but so also was the Swiss Federation, clearly not a seapower. Portugal and Spain, the leading seapowers of the Renaissance and the early modern era were not republics, although some "democratic" elements existed, like the Cortes in Spain. The United Provinces (Dutch Republic) and England seem to fit better into the Aristotelian thesis, the first being a Federation of seven independent Provinces ruled by General Estates and England having Parliaments during the reign of Elizabeth I and during most of the 17th century when it became a seapower and without interruption since the Glorious Revolution of 1688.

In this paper, we extend the original Aristotelian thesis to relate sea power and democracy to the creation of institutions fostering economy development. This *'extended'* Aristotelian thesis, supports the view that sea power *is linked to the emergence of new institutions and organizations, which reduce uncertainty by establishing a stable structure to human interaction* (North, 1990). *Institutions, determine ethics and codes of conduct and thus provide a structure to everyday life, are the determinants of economic performance* (North and Thomas, 1973), *embody new knowledge, and most of the times lead to innovation through better communications, specialization, and culture. This fosters a better organization of the 'production' making economy more efficient and growth promoting* (Vliamos, 2007).

Kyriazis–Zouboulakis (2004) have analysed the effects of Ancient Athens Naval Law of 482 B.C. (known also as the Decree of Themistocles) in shaping the Athenian democracy's political and economic institutions. By the 4th century modern organization forms like "general" merchant banks, naval insurance, joint-stock maritime companies, an extended services sector and a market economy characterised Athens (Cohen, 1977). Similar developments took place in Venice, (Lane, 1985; Norwich, 1977; Pezzolo, 2006), Genoa (Greif, 1994) the United Provinces (Kyriazis, 2005; Halkos and Kyriazis, 2005) and England (Kyriazis and Zouboulakis, 2003).

It seems that, although democratic institutions developed also in some non-maritime states like Switzerland, only in maritime states did the new forms of institutions and organizations emerge.

As to why this came about, the argument runs along the following lines: Maritime trade and seapower posed a challenge that required the development of specialized organizational skills. On the other hand, Navies were much more capital intensive than armies[2] (Rodger 2003, Glete 1993, 2002, Kyriazis 2006) and maritime expeditions to far off places[3] required huge capital outlays. This again led to the emergence of new forms of organization aimed to reduce transaction costs.[4] Maritime expeditions for trade or war (in the form of, for example, English or Dutch corsairs against the Spanish in the 16th century) became a repeated game.

Initially, first commercial expeditions of the English and Dutch to the spices islands took the form of joint–stock companies limited to one voyage only, ie dissolving at the end of each voyage. Once a voyage was successful and profitable, it was repeated. But if voyages were to be repeated, then why should the joint–stock companies not become permanent since this would reduce the transaction costs of establishing the companies each time anew? This is of course what happened. So, once permanent joint-stock companies were established, and in view of the huge capital outlays required, it became obvious, that by uniting the till then competing companies would bring a cost reduction, taking advantage of the increasing economies of scale. This happened, and the various competing companies merged to establish the English East India Company in 1600 and the Dutch one, the VOC in 1602.

The next step of the game is, that once permanent big joint-stock companies are established, then trade in their stock becomes easier, ie

transaction costs (in this case information costs) are reduced and trade in stock becomes frequent. So, a place where this is undertaken is established, ie Stock Exchanges like those in London and Amsterdam.

Lastly, new knowledge was acquired and this was diffused to the other, non-maritime sectors of the economy. True, the joint-stock model of company (called *"partenrederij"* in the United Provinces) was then used in most other sectors of economic activity, like drainage, port and canal construction, seweries, brick construction, textiles, industrial mills etc. (Kyriazis 2005).

European supremacy in the 17th and later centuries vis-à-vis non-European powers was based mainly to these institutional and organizational forms that did not develop anywhere else in the world. However even within Europe these differences were essential in shaping strategy and giving victory in the almost a quarter of a century long conflict of Great Britain and France[5] by the end of the 18th beginning of the 19th century.

2. The Continental System

By the year 1798 France had successfully withstood all attempts by the other European countries to crush the revolution and had signed peace agreements with them, except for Great Britain. France was at the time the most populous state in Europe, with an estimated population of 25-30 Mio inhabitants (Herold, 1963). Her citizen armies, with the "levée en masse" of the revolution, were also the most numerous in Europe. Armies were then labour-intensive. A training period of two-three months was deemed sufficient for a recruit to learn the rudiments of being a soldier.

On the other hand, as stated before, navies were capital intensive. The construction of a ship took months, and if the period of time is taken into account that was necessary for wood to ripen and dry (for ships to have a long time in service and not to rot within a few years) then the construction period was measured in years. (Glete, 1993; Rodger, 2004). The development of naval technology, training, logistics, organisation (like command, administration, dock-yards, port and facilities and shipyards), took tens of years. The creation of experience and what the French call "esprit de corps" took even longer.

These differences between armies and navies meant that while France could evolve in a relatively short period land armies superior and more numerous than those of its continental rivals, it would take a much longer period to evolve a navy capable of challenging British dominance. In fact, up to the beginning of the revolution, France ranked as the second naval power in the world (after Britain) with Spain the third. But since 1789, the French navy fell into disrepair and fast decline, due to neglect by the revolutionary leaders concentrating on the land peril and to the fact that many of the French navy's officers, members of the aristocracy, had either fled abroad or been executed during the period of terror of 1793-4 (Masson, 1981, Rodger, 2004).

Thus, the French government, being unable to challenge British supremacy at sea, tried to develop indirect ways to strike at Great Britain. Considering that India was the main source of the British Empire's wealth and power, the Directory entrusted to general Bonaparte to lead an expedition to Egypt, this being thought of as the first step to the opening of a land route for the conquest of India.

This first French attempt at implementing an indirect strategy failed because such a strategy could not succeed in the long run in the face of an enemy that controlled the sea, ie could and did interrupt the supply line of an expeditionary force that relied exclusively on sea communications.

The peace of Amiens (27 March 1802) brought a temporary peace with France dominating Europe and Britain, undefeated, dominating the seas. Peace might have been more durable, and might have been used by France in order to rebuild her maritime and naval capability, but for the ambition of Napoleon.

Napoleon's preconceived ideas concerning history and economy shaped his decisions and his strategy. Reading ancient history, he interpreted the Roman Carthaginian conflict by convincing himself that when a land power with substantial resources at its disposal both in population and in land and agricultural production, as Rome, faced a seapower like Carthage, which relied mainly on trade and "immaterial" wealth, the land power was bound to win, as Rome did[6]. In his mind, France and Great Britain were parallels of Rome and Carthage. France was 2,5 times more populous than Great Britain, had about double territorial area and was more or less self sufficient in agricultural products and the most necessary other resources like clothing.

metals etc (Cost considerations of domestic vis-à-vis foreign production did not seem to have played any part in his mind). Thus, his conclusion, in the long run France was bound to win, as Rome did (Herold, 1963).

What Napoleon apparently missed when using this historical analogue for his reasoning, was that Rome won only after it became a sea power and successfully challenged Carthagenian sea domination during the first Punic War. Rome achieved this by harnessing the naval experience of her Allies and subordinate states, like those of the Greek city – states of Southern Italy with their long naval tradition (e.g. Taranto) and by introducing a revolutionary weapon at sea, the "corvus" that transformed sea battles from contests of manoeuver and superior seamanship into equivalents of land battles, where the superiority of Roman legionaries was dominant. (Bagnall, 2002)[7].

By the time of the second Punic War, Rome was the dominant sea-power and Hannibal was compelled to take the long and risky overland route from Spain to Italy over the Alps in order to invade Italy. The Roman navy's command of the Mediterranean isolated Hannibal in Italy and prohibited his ally, king Phillip V of Macedon in joining him there.

Also, if Napoleon had a better understanding of history and the ancient writers, he would not have missed Thucydides lessons and warnings, which he put in the mouth of the King of Sparta Archidamus, at the beginning of the Peloponnesian War: *"And in war it is the expenditure which enables the weapons to bring results, especially in a conflict between a land power and a sea power"*, where, as he stated in the previous sentence, Athens allies contributed money, presumably making her thus more powerful. (de Souza et al., 2004, p. 123).

Napoleon had also preconceived economic ideas, based on superficial knowledge of the economic theory of the mercantilistic school[8]. Real wealth, for him, consisted of land, people, and industry producing for home markets. Trade, and, still more finance, were essentially parasitic activities, and an economy based on them was necessarily flimsy, exploitative and vulnerable. His object was thus to hit Great Britain at her Achilles heel, by denying her European markets for exports and re-exports. He also aimed to deny her strategic imports such as the all-important for her navy Baltic stores. At the same time, he also aimed to ruin Britain in mercantilistic fashion by forcing her to trade on disadvantageous terms, what would be called in todays terminology, adverse "terms of trade", i.e., to import goods which could only be paid for by exporting bullion. (Rodger, 2004). This was a direct application

of French mercantilistic theory, as exposed and implemented by Colbert, more than one century ago. Napoleon seemed to be totally ignorant of advances in economic theory as developed in other countries, notably Great Britain, with Adam Smith's "Wealth of the Nations" (1776), which was already more than a quarter of a century old when he introduced the *Continental System*. Even more astonishing perhaps, he seemed to be unaware of strong non-agricultural economic growth that was taking place in Great Britain, which has been called the "Industrial Revolution"[9].

So, with two Decrees, of Berlin of November 1806 and Milan of December 1807, Napoleon introduced the Continental System, a blockade of British products and trade to Continental Europe. The British response was a series of Orders in Council which declared all ports under French control to be blockaded, and permitted trade with them only on British terms. The effect of all these measures was to outlaw neutrality at sea, permitting ships of every nation to trade only on the terms of one or the other belligerent. The Continental System and the British response thus introduced for the first time in history total economic war. The only important neutral shipowning power not yet under French domination was the United States, but there the measures were resented more in principle by President Jefferson and his Republican party than in practice by the New England shipowners, who were for the most part opposition Federalists, and whose inflated wartime profits reconciled them to a great deal of inconvenience. Jefferson's response was the Embargo Act of 1807, intended to punish both belligerents, by denying them US exports, but in practice punishing principally his own compatriots, the merchants and shipowners". (Rodger, 2004 p. 552; C. Herold, 1963; Crouzet, 1995).

The System's success depended on two conditions: First, it had to be "watertight", that is, no "gates" or "windows" should exist on the Continent through which British trade would flow in and out, legally or illegally. It required a united continent and a solution to the so-called principal – agent problem. Napoleon was forced to conquer any country, even if friendly or neutral, which did not choose to participate in his economic warfare. Simply stated, neutrality was not permitted. Military strategy had thus to be shaped by economic goals, and subordinated to it. As will be exposed further on, this had disastrous results. Further, concerning the principal agent problem, the Continental System required that "agents" (be it the

governments of other countries, and the people entrusted with the implementation of the measures of the system at all levels, going as far down as simple "policemen", port and custom authorities etc) would comply. This required of course a prodigious monitoring effort and dedication of vast resources. Napoleon had practically to put in place a system of controlling thousands of miles of seashore from the Baltic to the Mediterranean, with hundreds of big and small ports, river inlets, islands and open beaches, to prohibit trade which could and did take the form of smuggling. Since, as will be seen, this was against the interests of both the ruling classes and the population of the continent's countries, France itself not excluded, such a system was doomed to failure.

Second, even assuming that a watertight Continental System could be introduced and maintained, a farther condition would have to be satisfied, namely, that Great Britain would really be ruined by its application. As will be seen also, this condition also was not satisfied. The entire Continental System was thus flowed from the beginning.

3. Strategic consequences

In order to apply the Continental System, Napoleon had to bring under his rule Portugal and Spain, since for the time being, after the peace of Tilsit of 1807 Russia was his ally, Austria cowed and Prussia neutral. The squabbles among the Bourbon Spanish royal family gave him the pretext to intervene and place his brother on the Spanish throne, but in Portugal his armies failed, because the British landed an expeditionary force under Wellington, which bolstered the Portuguese. Wellington's army fortified the line of Torres Vedras north of Lisbon, making them impregnable. The French army had to lay down a siege to take them, but they proved too strong. Here, for the first time, during the Napoleonic Wars the predominance of the naval power was demonstrated. Wellingtons army could be supplied by sea, while the French army, before the lines had to be supplied overland, a much lengthier, costlier and unsafe route. The end result was that the French army had to retreat in March 1811 nearly starved, while Wellington's survived more or less intact (Longford 1971).

Wellington begun his last counteroffensive, and here again the seapower's

strategic superiority was demonstrated through its influence on the concentration of forces on the battlefield. The French army of occupation reached an estimated peak of 350.000 men in the beginning of 1812 (Fletcher, 1997), a multiple of the British Portuguese army. But the French army, being denied sea communications, had to live of the land and so be dispersed at many locations, combined of course with the necessity to control the hostile country and deny the lengthy coastline with its many ports both to British landings and trade. Wellington's army on the other hand, had a secure supply line ending in Lisbón. His much smaller army could march and fight concentrated. Thus the effect of seapower was to equalize or even give numerical superiority to the Allies on the battlefields, against total French numerical superiority, which could not be brought to bear (Chartrand, 2001 & 2002; Fletcher, 1997 & 1998).

The Continental System did hurt to some extent Britain, although the recovery was fast after the first years, and did offer some opportunities for the expansion of French trade on the continent. Without doubt the great losers were the other European countries, among them Russia. Napoleon subjugated once more Austria and Prussia, but he had to bring a Russia reluctant to suffer from the embargo's consequences to heal. Russia had a very important trade in Baltic timber, furs, grain, flax, hemp, iron and tallow with Britain, importing luxury products like coffee, tea, chocolate, spices, porcelain and special clothes and textiles. Under the embargo Russia would have to forego this lucrative to both sides trade. A few years after the peace of Tilsit of 1807 the Russian King Alexander and his advisers decided that the Continental System harmed their country's interests and came back to the old trade patterns with Britain. Thus, long established economic interests proved stronger in the shaping of European Alliances than personal preferences, fears, enticements or diplomatic efforts. Thus, by 1812, the Continental System had two open gateways at the two ends of Europe, Portugal and some areas of Spain in the Southwest, and Russia in the Northeast. Napoleon had either to abandon the no longer efficient embargo, or to try by military means to compel Russia to come back to it's application. He chose the second course, which led to his 1812 invasion of Russia and the ruin of the Grand Army in the Russian snow. This was the beginning of the end for him.

Thus, driven by the economic necessity of his embargo, Napoleon was embroiled on a two front war, a situation repeated for Germany during the

two World Wars, when again the dominant land power fought against a coallitition led by the dominant seapowers. Every failure against England obliged him to extend his power farther in other directions, "until he overreached himself and fell". (Herold, 1963, p. 224).

4. Economic consequences

The Continental System, if applied strictly, would result in a great reorientation of trade and economic activity of all European countries, and through their control of colonies and trade, of the world economy. European countries imported grain (mainly from other European ones) fishing (herring and whale products the dominant categories here) spices, sugar, coffee, tobacco, chocolate, timber, bullion, ivory, clothing, porcelain and some minerals, to name just some of the main products. The continental countries would have to live without them, if the embargo were to be strictly applied, but of course the populations of those countries were not prepared to forego consumption of these products.

The first effect of the willingness of Europeans to continue their established consumption patterns was smuggling. While it is impossible to estimate to what extent the Continental System was vitiated by smuggling, there is no doubt that smuggling was practiced on a heroic scale and became the most lucrative form of business in Europe. Smugglers plied their trade back and forth across the Channel almost every night and on foggy days. From the coast of northwest Germany long wagon trains of contraband goods traveled into the interior, with the connivance of Napoleon's own brother, king Jerome of Westphalia. Louis Bonaparte, also brother of Napoleon and King of Holland, placed on the throne by him, carried on trade with Britain almost openly. In order to bring him to bay, Napoleon forced him to abdicate and annexed Holland to France in 1810, followed by the annexation in early 1811 of the entire northwest coast of Germany as far east as Lübeck, in a vain attempt to enforce the System (Herold 1963).

Snuggling flourished, but in some parts of Europe, the effects of the blockade were felt severily. In the German provinces of the empire for example, the effects of the blockade lead to great public exasperation. Hamburg was totally ruined by the new measures. Hundreds of ships lay

rotting in the harbor and some of the principal industries, including sugar refining and cotton printing were completely shut down (Herold 1963).

In France the period 1806–1810 was one of rising prosperity even through she lost all her West Indian colonies to the British and although her merchant fleet was destroyed or paralysed. This can be explained by the fact that French manufacturers found a large outlet on the French dominated continent, while the agrarian reform and the abolition of internal trade barriers such as tariffs, by the revolution, were beginning to prove their beneficient effects. New manufactures and manufacturing processes sprang into existence and were encouraged by the government, while new chemical processes made possible to find adequate substitutes for such colonial products as cane sugar (for which a beet sugar was substituted) and indigo (Herold 1963).

Thus, the paradox of the Continental System was that while its two main protagonists, France and England prospered, third parties suffered, some to the point of ruin. The attempt by the two powers to influence these third parties influenced strategy. France, who was the offensive player, introduced in the first move the Continental System blockade, and then was forced in its next moves by it. Strategy had to follow the demands of the system, i.e., it had to keep all European countries aligned behind it. Countries that did not want to apply it, like Holland, Germany (with its many states), Portugal, Spain, Austria, Denmark, Sweden, Prussia, Russia, had to be invaded, annexed, cowed and subjugated. In the long run all European countries faced a simple but difficult choice: either peace with Napoleon coupled with economic decline or ruin, or war against him in the hope of returning economic prosperity. In the end, most chose the second option.

Britain, secure behind her "wooden walls", her fleet, could adopt a more Fabian strategy, of waiting and reacting to Napoleon's moves, taking into account European dissatisfaction. Seapower gave her tactical flexibility. While Napoleon could not invade Britain, Britain could land expeditions on the periphery of the Continent (either by keeping Sicily out of Napoleon's reach, or later Lisbon behind the lines of Torres Vedras) creating new military fronts for him, and breaching the walls of the Continental System, allowing trade to flow in. Second, economically and financially strong, England could and did use its financial strength, translating it into military strength by granting subsidies to her Allies, Napoleon's enemies. Wellington's army for example had strong contingents of

Portuguese and Spanish troops, whose financial cost was borne by Britain. Spanish regular revolutionary armies and guerillas were again supported by English financial grants. The same was true for Austria, in 1807-9, for Prussia in 1807, and for the Great Coalition of 1813-14. The armies fighting against Napoleon may have been Russian, Prussian, Austrian, Swedish, Portuguese, Spanish, Dutch, Saxon etc, but their means of finance were in great part English.

This was Napoleon's greatest misjudgment of his rival's economy: First Great Britain's economy, based on trade, industry and finance and to a much smaller degree on agriculture, was not weak, but inherently strong. Second, seapower allowed to Britain the freedom to trade with the rest of the world and evolve new trade partners, find alternative sources of supply and open new markets for her products. Even if the Continental System was "watertight" which as shown above it was not, and Britain was totally excluded from Europe, it still was free to trade with the rest of the world. As long as France was excluded from the seas, ie as long as France did not challenge England's naval supremacy, Napoleon was powerless to influence these developments.

Apart from the fact that Great Britain was able to act as the various anti-French coalitions treasurer, the expenses she bore for the navy attested her financial strength. Naval finance was 4,000,405 in 1791 (the Commons authorization for the naval budget), expenses for the navy were 4,491,669 pounds and accumulated naval debt 2,310,280. In 1813 the corresponding amounts had reached 21,212,280, 23,716,390 and 8,562,291, an increase of between 400-500% during the Napoleonic Wars. By 1815, the Commons had authorised a naval budget of 19,032,700 pounds, expenses had fallen to 16,366,445 and the naval public debt had already been reduced to 3,694,824 pounds. (Rodger, 2004). According to estimates, (O'Brien, 2004) total taxation in constant prices of the period 1451-7, had increased from less than 200,000 to about 5,500,000 during 1800-1810, doubling during the last twenty years of the period, ie from about 2,500,000 in 1790 to 5,500,000 by 1810 (O'Brien, 2004).

Government revenue came from taxes, the principal direct one being Land Tax levied on a fixed assessment since 1692, and indirect taxes, mainly excises. By 1797 real income from land was grossly underestimated and no other income was taxed at all. Pitt's government undertook a tax reform, taxing incomes and wealth according to some indicators of luxury consumption. It taxed horses, dogs, servants, carriages, coats of arms and even hair powder. By 1798, these self-assessed taxes were tripled and when

tax revenue at 3,5 Mio fell short of the estimated 7 Mio. then Pitt's government introduced the first direct income tax. During the war, 58% of the cost was met from taxation increasing to 70% between 1800 and 1815. The proportion of direct to indirect taxes exceeded one third. By comparison with the period of the American War of Independence, government debt increased by 300% but tax receipts in money terms increased by more than 500% reaching 20% of national income (Rodger, 2004).

On one point Napoleon was proved right in his views: Gold started to be short in Great Britain mainly because so much had been exported to subsidize Britain's allies, or spent on importing grain after the bad harvest of 1795-6. The Bank of England was forced to suspend the convertibility of its notes. According to mercantilistic views, this should have been equated with Britain becoming poorer and nearing bankruptcy. Here Napoleon erred: Britain was able to use its strong financial institutions, capital markets and banking system. The Bank of England continued to circulate non-convestible notes (up until 1822) managing the supply with prudence. Neither the credit of the bank nor the value of the currency was seriously damaged. Going off the gold standard allowed the British economy during the course of the wars to be gently reflated, ensuring maximum production and employment. In fact, during the Napoleonic period, the British government undertook a policy that can be interpreted in today's, terminology as Keynesian: A combination of cautious expansionist monetary and fiscal policies, the first implemented by the issue of non convertille notes by the Bank of England, and the second by the finance of public debt (the difference of budget authorizations and expenses) through bond issues on London's capital market.

As a matter of fact, the Victualling Board was the largest single purchaser on the London markets for agricultural products. It followed a policy of managing the markets so as to encourage the growth of large firms while at the same time promoting competition. This influenced the growth of a sophisticated and integrated national and international agricultural market. The British economy was characterized by producers, even small ones in remote parts, who were accustomed to serving a national market, exporting their goods, usually by coastal shipping to London, being paid by bills which they could discount locally, investing their savings in the financial markets. Long before the industrial revolution began, a financial, institutional, commercial and agricultural revolution had taken place, which

made the British economy the most sophisticated in the world, and which linked internal commerce and production to international trade flows. This economic sophistication gave to Britain a distinctive advantage over France (Halkos - Kyriazis, 2005). The geography of the British Isles gave most districts access to coastal shipping and the efficiency of water transport, costing at most about one-twentieth of road transport, made possible a network that integrated local markets into a single national and then international one. France was a bigger country with a larger population but it lacked an integraded economy. Its great commercial ports were linked to foreign countries rather than the interior of France. France lacked a network that would integrate regional markets into a national one. French trade and commerce was mainly with its colonies, not within the country itself, as was in part the case with British seaborne trade. The French West Indian colonies, generated two-thirds of France's trade and shipping. First among them Saint-Dominique generated two-fifths of French foreign trade and two-thirds of its deep-sea shipping (Rodger 2004).

Thus we arrive at a very interesting conclusion concerning the relation of seapower, trade patterns and political structure. Britain, the principal seapower, was characterised by a decentralised political system, where local political bodies had substantial autonomy and decision making powers, and at the same time had an advanced market economy, where the whole country was integrated into one market, served by a network of shipping for internal and foreign trade. France, mainly a landpower, was characterised by a centralized political system, where local political bodies did either not exist, or at most had limited autonomy in decision making and had to execute the decisions taken and imposed upon them at the center (As stated above, the problem of executing the decisions was different from taking the decisions). On the other hand, France was still economically not integrated to the same degree as Britain into a single market. Regional markets were still to a higher or lesser degree isolated from one another. Seapower and shipping brought down in the case of Britain transaction costs of all kinds, and thus promoted a relatively efficient global market. Lacking seapower and sufficient shipping, France had higher transaction costs, that inhibited the creation of an integrated, efficient global market.

Even assuming that Britain was excluded from trade with Europe through an application of the Continental System, she could trade due to her maritime supremacy with the rest of the world. Although estimated trade statistics for the

period have to be approached with caution, it can be estimated that over two thirds of British trade by the end of the 18th century was not with Europe, but with the "rest of the world", in which the British colonies are included. By 1798 for example 57% of British exports went to the Americas (Rodger 2004). British ships and British seamen in ever-growing numbers still earned their living in the transatlantic trades. British merchants offered American consumers the goods they wanted and American exporters the prices and credit terms they needed.

In the long-run the Continental System was beneficial to Britain, because it enabled her to substitute her products, trade and shipping in place of that of her rivals, France, the Netherlands, Spain and Denmark. During the wars, Britain managed to conquer all French, Dutch and the few Danish colonies, while the Portuguese colonies were always open to British trade, and the Spanish ones were first obliged to trade with Britain, being to a high degree cut off from Spain, and then, after the Spanish anti-French revolution, they were willing trade partners. Simply put, even if Britain were to be excluded from European, trade, it could freely trade with the USA, Canada, Latin America, Africa, India, China, Indonesia (and the important Dutch spice islands), the Ottoman Empire and the other Asian countries. It could and did develop alternative sources of supply in cases were old ones were threatened by the embargo. For example, the navy depended on Baltic imports of timber and naval supplies for its ships. When this source was closed temporarily after 1807, the navy started building ships using tropical woods (mainly teak) in shipyards in India. In the beginning this possibly led to an increase in cost, but these ships had a longer service-life, so that in the end this change of supply was cost-efficient. Crouzet (1989) estimates that British exports grew at mean rates of growth per year of 3,1%, re-exports at 2,3% and imports at 1,2% during 1802-1814.

The Napoeloonic Wars coincided partly in time with the Industrial Revolution, which makes the economic effects of the wars on the British economy somewhat difficult to distinguish clearly. Among others, the emergence of the factory system and the merchanisation of cotton spinning had been taking place, as well as canal construction and accelerating population growth. Due to technology advances and mechanization, the composition of British exports underwent a major change during the wars. Exports of cotton products grew much faster than those of other goods, their share of total exports' value increasing from 6% in 1784-6 to 40% in 1814-16.

Inflation increased by 90% from 1790 to 1813, ie an average rate of inflation of about 3%. Depreciation of the inconvertible pound was limited to 41% in relation to silver by 1813. Monetary policy by the Bank of England combining a generous discount policy on notes issues, floating of public debt, inconvertibility of the notes and floating exchange rates during 1797-1821 helped to safe-guard confidence in the currency which was almost unimpaired, in total contrast to the situation of the French assignats (Crouzet, 1989).

Fiscal policy had a "modern" character of redistribution in favour of profits and investment, since war finance imposed heavy custom or excise duties that fell mainly on consumption. (Crouzet, 1989).

The average ratio of productive investment remained fairly stable during the wars. High government borrowing did not produce a "crowding out" of investment, because government loans were subscribed thanks to an increase in total savings. The "savers", ie the prosperous parts of the population displayed a higher propensity to save and to lend to the government. War expenditure gave a sharp (Keynesian) stimulus to an economy which had unemployed resources, national product was increased and to some extend the war paid for itself (O'Brien and Crouzet 1989).

The developments following Britain's transformation into a seapower in the 17th century established the financial institutions and the changed economic structure, which made possible the British war effort. The British managed to pay on a per head basis and in wheat equivalent three times more taxes than the French. This again demonstrates clearly the superiority of the British economic system.

Even Denmark, one of England's most dedicated enemies after the battle of Copenhagen, had to face reality and evade the Continental System, in order to allow her ships to bring much needed foodstuffs to Norway, then part of the Danish state.

Thus, in the long run, while the Continental System brought ruin to France's allies, it brought prosperity through world trade domination to Great Britain.

5. A game theory formulation of strategy

The French revolutionary and Napoleonic Wars may be analysed in a

game theoretic context of strategy, with a basic difference from usual games, in that the two players, England and France start with different and unequal conditions. This initial inequality shapes the strategic choices of the two players: In a game with a short run time horizon, France, the land locked player, can adopt only a strategy of indirect attack against her rival, England, the naval player, because she is unable to confront her directly. In historic terms this attempt by France took two forms: First the Egyptian expedition and then the Continental System. Both ended in dismal failure, which in the end brought down the French state itself. In game theory terms, both strategic options are worse for France than a strategy of doing nothing, ie France should adopt a strategy of preserving the status quo, peace and non-provocation of Great Britain. All other strategic choices lead to a worse outcome than the initial situation. If the outcome of strategy one, preserving the status quo, is denominated as S_1, and the outcomes of strategies of indirect attack are denominated as S_2, then S1 dominates S_2, ie $S_1 > S_2$.

The opposite is true for the outcomes of the naval player, Great Britain. If the land locked player decides to start war, in the end the outcome is favorable for the seapower, ie for Great Britain S_2 is better than S_1, $S_2 > S_1$. In reality, the Peace of Vienna in 1815 gave to Great Britain undisputed world leadership for almost a century, to the outbreak of World War I and economic leadership, combined with her industrial revolution that lasted to the end of the 19th century. Only in the last decades of the 19th century did the US GDP per head overtake the British one.

If the game is played with a long time horizon, then the land player has a viable alternative strategy that may offer a possibility (but not a guarantee) of success, which is to become itself a seapower and challenge the seapower on its own terms. This was the strategic choice undertaken successfully by Ancient Athens when facing the Persian invasion, the Peloponnesian League and Sparta when facing Athens during the Peloponnesian War, and Rome when facing Carthage during the first Punic War.

After Trafalgar and during the Continental System, Napoleon did attempt to transform France into a seapower in the sense of trying to build a fleet strong enough to challenge British supremacy. According to recent research this effort should not be taken too seriously, because "In fact much of the building effort, like all Napoleon's naval plans, was based on

fantasy". (Rodger 2004, p. 562). Hastily constructed of green timber to obsolete designs, many of these ships were rotten before they were ever commissioned. Shipwrights were scarce and poorly paid which resulted in poor building quality. But even more important perhaps morale and discipline remained very poor, especially among officers. As stated before, it takes years to build ships but at least decades to build an efficient navy. Napoleon's Continental System and its strategic results prevented France from enjoying the time needed to become an efficient seapower.

The institutional theory of growth (Kyriazis 2005) in relation to the concept of path–dependence (Arthur 1989, David 1994, and 1985) shows that countries are bound by their historic past, by the norms, customs and institutions developed during centuries. These norms, customs and institutions shape also the future, letting a country develops along one historic path to the exclusion of others. Path–dependence is strong, but can be broken. Usually, the probability of this happening is greater, when a country faces a very great external challenge that makes such a change a matter of survival. This was the historic situation of Ancient Athens facing Persian invasion prior to 480 B.C., England's facing Spanish invasion prior to 1588 and the United Provinces facing Spanish occupation during their revolution prior and after 1568.

The changing economic structure of Great Britain enabled it also to mobilize a higher percentage of it's population for the war effort than other countries, a situation similar to that of the United Dutch Provinces during the 17th century (Kyriazis 2005).

The population of England and Wales increased by 2,146,000 inhabitants, from about 5,5 Mio in 1791 to about 7,7 Mio in 1811. At the end of the wars, about 500.000 men were serving in the army and the navy, corresponding to about 10% of men in the age group 18-45, or almost 5% of total population of about 10 Mio, including Scotland. Astonishingly, there is no evidence of a widespread shortage of labour during the wars (Crouzet 1989).

France on the other hand did not manage to break historic path – dependence and instead of a land based centralized and autocratic country, to become a more democratic seapower. The French revolution itself degenerated very fast into the Napoleonic autocratic regime, which from the point of view of decision making powers was more concentrated in a few hands, Napoleon's and his very close collaborators, than the French kingship it superceded. From the point of view of institutional development

and government, the Napoleonic empire was a retrogression, which stood in stack contrast with institutional developments in Great Britain.

Great Britain during this period is a very good example that vindicates the extended Aristotelian thesis. Seapower was linked with institutional development both in the political area in the form of progressive-evolutionary democracy, and in the economic area, in the form of the evolution of markets and efficient financial institutions like the stock exchange, capital markets, banks, joint stock companies, insurance, trade, industry and agriculture.

NOTES

1. This is an important point: The forms of government should be compared across countries during the same historic periods and not with hindsight, to what we understand as democracy today. Thus, Venice and the United Provinces, both called themselves Republics, although by today's standards they would qualify rather as oligarchies, ruled by their merchant classes. But again, both Venice and the United Provinces were at that time more democratic than absolutist states like Russia, Prussia or France.
2. Using for example as a measure of capital intensity guns per men or outlays other than payment to crews and men in armies. For estimates, see Halkos-Kyriazis (2005).
3. For example, deep sea fishing for herring in the Northern Seas or whaling, but even more to discover and exploit spices.
4. Institutions affect the performance of the economy by their effect on the costs of exchange and production. Along with the technology employed their operation determines the transaction and transformation costs, i.e. they enter into the cost function in an economy (North, 1990, p. 5 & 6).
5. It is striking that although institutional creation and change shape the way societies evolve through time, current economic theory does not show any appreciation to their role in economic performance, because there has not been yet any analytical framework to integrate any institutional analysis into economics and economic history (Gemtos,

2001, ch 1; Hodgson, 1988, ch. 1 &2; North, 1990, ch. 1)

6. Reflecting upon the rise and fall of ancient empires during his garrison days at Auxonne as a lieutenant, he reached the following conclusion: "Experience nearby always proves that the maritime state will be defeated because war destroys its commerce and gradually exhausts it whereas its opponents are toughened and strengthened" (Herold, 1963, p. 208). The influential American admiral Mahan reached the opposite conclusion a century later, because the outcome of Napoleon's struggle with England supplied him with the most forceful argument conceivable in favor of the supremacy of sea power (Mahan, 1890, 1980).
7. Bagnall (2002) goes as far as to state that as an example of innovation that led to a precipitous reversal of battlefield superiority, the corvus outclassed all subsequent development such as gunpowder, radar. submarines, the tank, air power and electronic warfare.
8. Rodger (2004, p. 442) calls them "primitive".
9. According to newer theoretic contributions (Kyriazis 2005, Kyriazis – Zouboulakis 2004 and Halkos–Kyriazis 2005), part of the explanation of the Industrial Revolution taking place in Great Britain and the United Provinces, was that sea power helped these two countries to create the institutional framework and conditions that were propitious for the Industrial Revolution. This is something that the present paper also supports.

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